

REMARKS

Claims 1-20 are pending in this application. Reconsideration in view of the following remarks is respectfully requested.

Entry of this Response is proper under 37 C.F.R. §1.116(b) because the Response: (a) places the application in condition for allowance as discussed below; (b) does not raise any new issues requiring further search and/or consideration; and (c) places the application in better form for appeal. Accordingly, Applicants respectfully request entry of this Amendment.

In the Office Action, claims 1-20 are rejected under 102(b) as allegedly being anticipated by Chen *et al.* (U.S. Pat. No. 6,399,486), hereinafter “Chen”.

With respect to claim 1, Applicants submit that Chen fails to disclose or suggest each and every feature of the claimed invention as is required under 102(b). Chen does not disclose or suggest etching through an interlevel dielectric (ILD) layer and *partially* into an underlying cap layer thereby *leaving* an opening through the ILD layer and a *remaining portion* of the underlying cap layer. (emphasis added)(See claim 1, as similarly recited in claims 8 and 16.)

Interpreting Chen only for the purposes of this response, Applicants submit that Chen merely discloses a method that employs a special annealing process to a dual damascene structure for removing defective copper voids. Abstract. There is simply no teaching, or suggestion, in Chen of etching into an underlying cap layer whatsoever, partially or otherwise. In the Office Action, the Office states that Chen discloses “the method comprising the steps of: etching through an interlevel dielectric (ILD) layer (Figure 2, reference 4) and partially into an underlying cap layer (Figure 2, reference 6) thereby leaving an opening through the ILD layer and a remaining portion of an the underlying cap layer;” (Final Office Action, page 2, item 2). The alleged cap layer (reference 6) in Chen is an etch stop layer that does not get partially etched

but is fully removed (see e.g., Fig.2). “[T]he etch back and *removal* by dry etch, reactive ion etch (RIE), of the etch stop layers 6 and 8 in the exposed via and trench regions.” (emphasis added)(Col. 7, lines 12-14). Chen addresses the need to remove these harmful microscopic defects 10 that occur on the exposed surface of insulator layer 7 as a result of the full removal of the etch stop layers. “[S]ome microscopic defects 10 [] occur on surface of the insulator layer 7, as a *direct result* of the *removal of the etch stop/liner material.*” (emphasis added)(Col. 7, lines 14-17). Further, as it is desirable to provide ultimately an effective connection between copper metal interconnect 5, copper seed layer 16, and copper deposition 18 in the dual damascene structure of Chen, it is entirely technically unfeasible to partially remove etch stop layer 6. In sum, Chen is completely silent regarding any type of underlying cap layer, or of any partial etching therethrough.

Accordingly, Applicants submit that there is no disclosure or suggestion in Chen of a method that includes a step of etching through an ILD layer and partially into an underlying cap layer with respect to claim 1. Therefore, Applicants respectfully request withdrawal of the rejection.

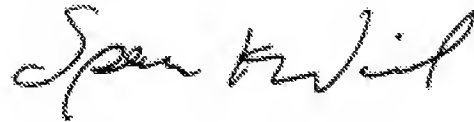
In the Office Action, independent claims 8 and 16 are rejected under the same rationale as claim 1. As a result, Applicants herein incorporate both arguments submitted above with respect to claim 1. Accordingly, Applicants respectfully request withdrawal of the rejection.

With respect to dependent claims 2-7, 9-15 and 17-20, Applicants herein incorporate the arguments presented above with respect to the independent claims from which the claims depend. The dependent claims are believed to be allowable based on the above arguments, as well as for their own additional features.

CONCLUSION

In light of the above remarks, Applicants respectfully submit that all claims are in condition for allowance. Should the Examiner require anything further to place the application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the number listed below.

Respectfully submitted,



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